

What is Supervised Learning?



Supervised Learning

- Type of machine learning
- Learns a function to map an input to an output
- Uses sample input-output pairs

Supervised Learning Algorithm

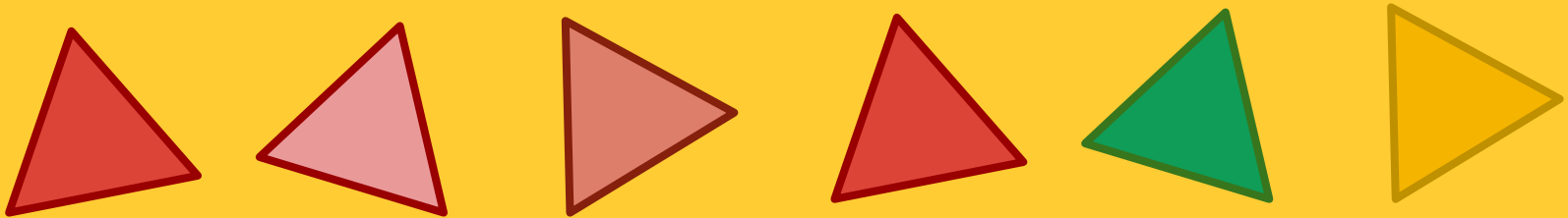
- Analyzes training data
- Infers a function



We can use the function to determine
classes of brand new data

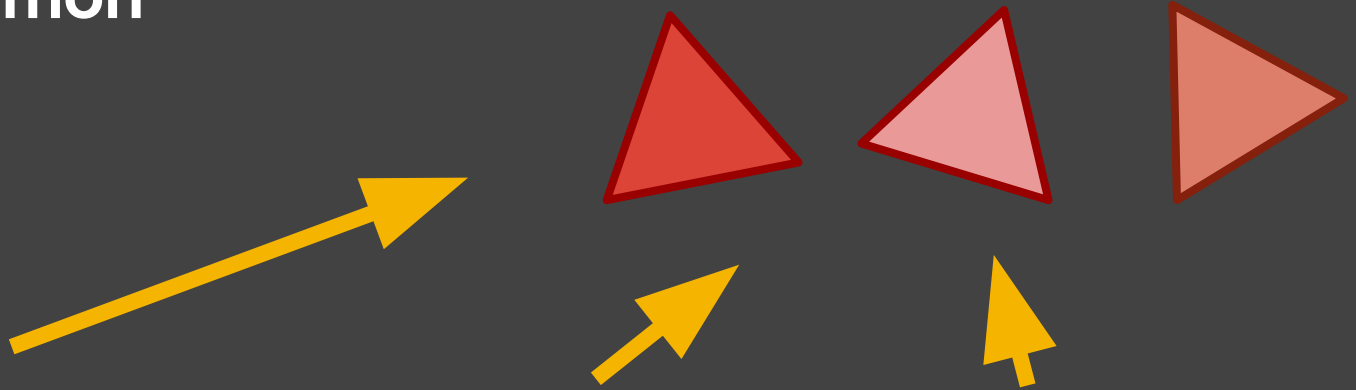
Supervised Learning

- Parallel task in psychology:
concept learning



Concepts

- Category of stimuli that have features in common



Three sides

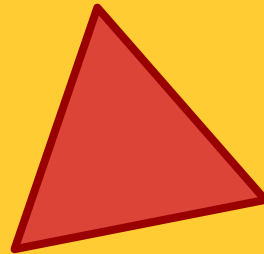
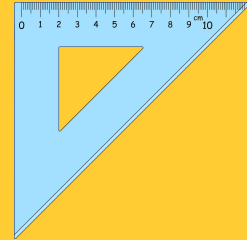
Three straight lines

Shades of red

Concept Learning



- Ability to apply knowledge across a variety of circumstances



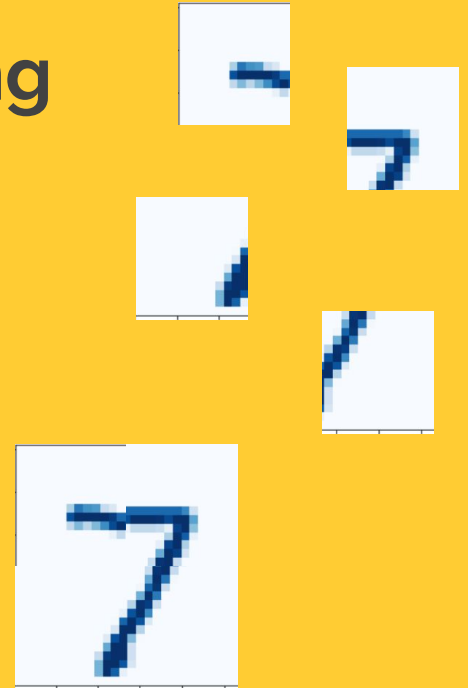
Gagne's Hierarchy of Learning

1. Signal Learning
2. Stimulus-Response Learning
3. Chaining
4. Verbal Association
5. Discrimination Learning
6. Concept Learning
7. Principal Learning
8. Problem Solving

Supervised Learning Algorithm

1. Determine the type of training examples

- a. Handwritten character?
- b. Handwritten word?
- c. Handwritten sentence?

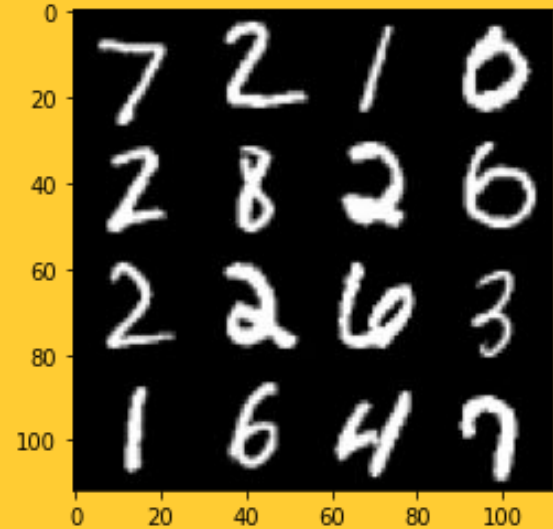


Supervised Learning

Algorithm

2. Gather a training set

- a. representative of
real-world use of the
algorithm



Supervised Learning Algorithm

3. Represent input features

- Affects algorithm
accuracy

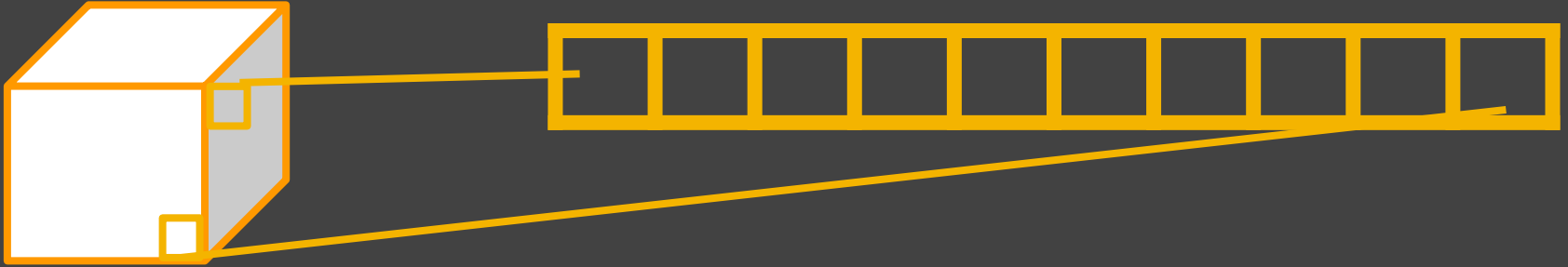
4	2	56
45	3	34
12	74	22



45	34
12	22

Transform input into a feature vector

- features descriptive of the input



**Number of features should not
be too large**

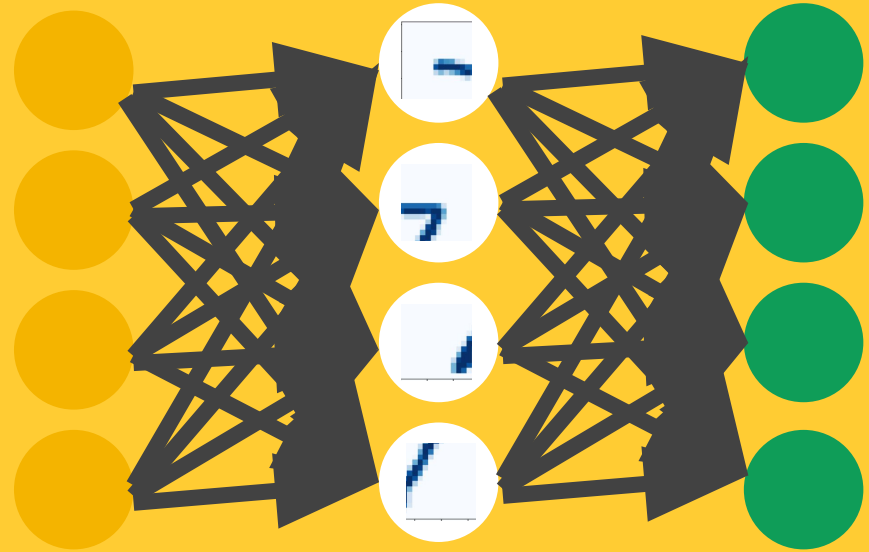
- **contain enough information to
accurately predict output**

Supervised Learning Algorithm

**4. Determine structure of
learned function and
algorithm**

Decision tree?

Neural network? ...



Supervised Learning Algorithm

5. Train algorithm with training set.

Adjust parameters

6. Evaluate accuracy with a testing set

What is Supervised Learning? ✓

